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The Health of First Nations Living Off-Reserve, Inuit, and Métis Adults in Canada: The Impact of Socio-economic Status on Inequalities in Health

by Rochelle Garner, Gisèle Carrière, Claudia Sanmartin and the Longitudinal Health and Administrative Data Research Team

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About the Longitudinal Health and Administrative Data Initiative

The Longitudinal Health and Administrative Data (LHAD) Initiative is a partnership among provincial and territorial ministries of health and Statistics Canada, as well as the Canadian Institute for Health Information, the Canadian Council of Cancer Registries and the Vital Statistics Council for Canada. The objective of the Initiative is to address important information gaps by ensuring that key administrative data, such as those routinely collected through the health system, can be used to undertake pan-Canadian research to improve the understanding of relationships among risk factors, socio-economic characteristics, health status measures and health care utilization. The research involves the linking of provincial and territorial health administrative data within themselves, and with Statistics Canada population health survey data, the births and deaths databases, and the Canadian Cancer Registry. In addition to complementing the important record linkage research already being done within individual provinces, LHAD studies create invaluable opportunities to learn from comparisons among jurisdictions, as well as facilitate larger studies for less common types of events and conditions. In short, the LHAD Initiative is intended to establish the foundation for a Canadian record linkage program to help further the advancement of knowledge about health determinants, outcomes and their relationships.

Statistics Canada is the operational arm of the LHAD partnership. Two divisions within Statistics Canada - the Health Statistics Division (HSD) and the Health Analysis Division (HAD) collaborate in supporting the Initiative.

HSD is responsible for ongoing administrative support including organizing Steering Committee meetings and providing secretariat services to the Initiative. It is also responsible for building and maintaining the LHAD data processing environment, securely storing and processing LHAD datasets, and producing linked analysis files for all approved studies.

HAD provides research support to the LHAD program via the LHAD Research Team. HAD is the primary source of health research within Statistics Canada. Its mandate is to provide high quality, relevant and comprehensive information on the health status of the population and on the health care system. This project represents one of four research studies undertaken by the LHAD Research team from the research agenda developed by the LHAD Steering Committee in 2008.

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The analyses and conclusions in this report do not necessarily reflect those of the individual provincial representatives or their respective ministries of health.

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Executive summary

Aboriginal people – First Nations, Métis and Inuit – comprise a growing proportion of the Canadian population. Despite the younger average age of these populations, First Nations, Métis and Inuit people tend to suffer a greater burden of morbidity and mortality than non-Aboriginal Canadians. This may be due, in part, to higher rates of socio-economic disadvantage in Aboriginal populations.

The objectives of the current study were:

- To describe the health and well-being of Inuit, Métis and First Nations adults living off-reserve, and to compare these characteristics to those of non-Aboriginal adults;
- To examine the contribution of socio-economic and lifestyle factors to the health inequalities between Inuit, Métis and First Nations adults living off-reserve and non-Aboriginal adults; and
- To examine the health-related impact of socio-economic and lifestyle factors for each of non-Aboriginal, First Nations people living off-reserve, Métis and Inuit adults.

To achieve these objectives, analyses were conducted using data from the 2006 Aboriginal Peoples Survey and the 2007 Canadian Community Health Survey (Cycle 4.1). Examinations were limited to adults aged 20 and older from both surveys.

Findings showed that First Nations, Métis and Inuit adults were less likely to report excellent or very good health than non-Aboriginal adults, and were more likely to suffer from an activity-limiting condition. Furthermore, First Nations and Métis adults were more likely to be diagnosed with one of several chronic conditions than were non-Aboriginal adults, whereas Inuit adults were equally or less likely to be diagnosed with such conditions. Taking into account factors such as income and education minimized, but did not always eliminate, health disparities between Aboriginal and non-Aboriginal adults. Adjusting for other factors such as smoking status, body mass index, contact with a health professional, or living in an urban centre did little to further lessen health disparities. As well, the impact of many of these factors on health was different for the various Aboriginal groups than they were among non-Aboriginal adults.

Results of this study showed that, while income and educational levels partially explained differences in health between Aboriginal and non-Aboriginal Canadians, disparities often persisted. Such findings point to the existence of other factors contributing to the greater burden of morbidity among First Nations, Métis and Inuit people. Furthermore, the factors often associated with health in the general population do not act in the same way among specific Aboriginal populations. Future research may wish to examine broader, more culturally-relevant predictors of health among Aboriginal people.

Table of contents

Introduction 1
Study objectives 1
Findings 3
Aboriginal people more likely to report poorer health outcomes 3
The case of diabetes 3
Accessing health professionals 4
Socio-economic and demographic profiles differ 5
Smoking and body mass index 7
Income and education explain some but not all differences in health status 7
Sequential models for general health status 7
Sequential models for likelihood of being diagnosed with at least one chronic condition 7
Sequential models for diabetes, asthma and arthritis 8
Factors associated with health outcomes different for Aboriginal and non-Aboriginal adults 9
Discussion and conclusions 16
References 16
Technical notes 18
Calculating and comparing descriptive (proportion, means) statistics 18
Comparing estimates from a single logistic regression model 18
Comparing estimates from separate logistic regression models 18
Appendix 19

Introduction

Over the past number of years, the proportion of Aboriginal people (First Nations, Métis and Inuit) in the Canadian population has been growing. According to the 2006 Census, Aboriginal people comprised 3.7% of the population, up from 2.8% only ten years prior.[1] This increase has been shown to be driven, not so much by increased fertility rates, but rather by ethnic mobility, which refers to changes over time in the ethnic identity that individuals report.[2] In other words, a greater proportion of Canadians are self-identifying as Aboriginal persons than did in the past.

On average, the Aboriginal population is considerably younger than the non-Aboriginal population. Nearly half (47%) of the Aboriginal population is under the age of 25, compared to less than one-third (30%) of the non-Aboriginal population (Figure 1).

Despite being a younger population, the health and well-being of Aboriginal people in Canada is generally poorer than that of non-Aboriginal Canadians. For example, in 2001 the life expectancy of those living in Inuit-inhabited regions of the country was more than 12 years lower than that for the Canadian population as a whole,[3] and those reporting Registered Indian status had significantly higher mortality rates than those who did not.[4] First Nations and Métis adults tend to report poorer general health, are more likely to report chronic conditions such as diabetes, arthritis or high blood pressure, and are more likely to suffer an activity-limiting condition than non-Aboriginal adults.[5-8]

In addition to various health inequalities, there are also significant inequalities in terms of socio-economic resources and conditions between Aboriginal and non-Aboriginal people in Canada. According to the 2006 Census, non-Aboriginal Canadians reported higher personal incomes on average than did people who self-identified as Métis, Inuit or First Nations.[9] There are also significant gaps in educational attainment, whereby Aboriginal people are less likely to complete high school or achieve postsecondary education than non-Aboriginal people.[7,10-12]

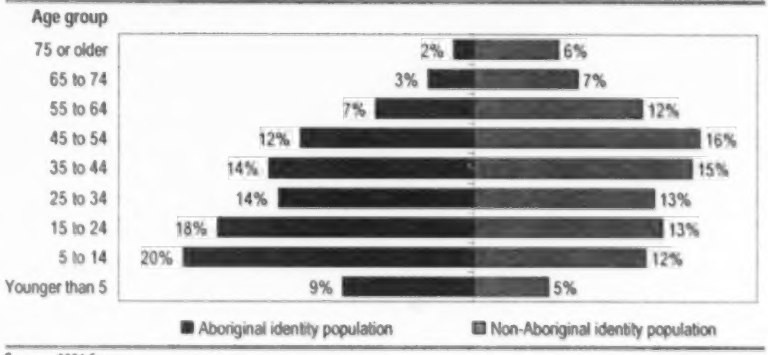
There is a large literature linking poorer socio-economic conditions with poorer health outcomes.[13-21] Given this association, it is possible that the health inequalities experienced by First Nations, Métis and Inuit adults are the result of poverty and socio-economic disadvantage. Conversely, health disparities may persist even in the absence of socio-economic differences between Aboriginal and non-Aboriginal people.

Study objectives

To address such issues, the present study had three objectives:

1. To describe the health and well-being of Inuit, Métis and First Nations adults living off-reserve, and to compare these characteristics to those of non-Aboriginal adults;
2. To examine the contribution of socio-economic and lifestyle factors to the health inequalities between Inuit, Métis and First Nations adults living off-reserve and non-Aboriginal adults; and
3. To examine the health-related impact of socio-economic and lifestyle factors for each of non-Aboriginal, First Nations people living off-reserve, Métis and Inuit adults.

Figure 1
Age distribution of Aboriginal identity and non-Aboriginal identity populations, Canada, 2006



Source: 2006 Census.

Data sources

This study used two data sources. The first, which provided health information for Aboriginal people, was the 2006 Aboriginal Peoples Survey (APS). The second data source, which provided health information for non-Aboriginal people, was the 2007 Canadian Community Health Survey (CCHS), Cycle 4.1. Both surveys contained similar health and socio-demographic questions which were used to compare health and socio-economic conditions between First Nations, Métis, Inuit and non-Aboriginal adults (ages 20 and up).

The Aboriginal Peoples Survey (APS) provides data on the social and economic conditions of First Nations people living off-reserve, Métis and Inuit, aged 6 years and older. As a post-censal survey, the 2006 APS used responses to the 2006 Census as a basis for sampling. Further details on the APS can be found elsewhere.[22] The APS sample used in this study was limited to those aged 20 and older (n=25,236).

In the Census, and included in the APS, individuals reported whether they self-identified as an Aboriginal person. More specifically, individuals indicated whether they self-identified as First Nations (North American Indian), Métis or Inuit. Individuals who responded affirmatively to a single Aboriginal identity category were retained in the sample of Aboriginal respondents (n=20,086). Individuals who did not self-identify as Aboriginal (n=4,231), who responded to multiple categories in the Aboriginal identity question (n=472) or who indicated that they were part of some other Aboriginal identity population (n=447) were excluded from the sample. The final sample of Aboriginal adults included 4040 Inuit, 7279 Métis and 8767 First Nations adults living off-reserve.

As noted, the 2006 APS was only conducted off-reserve. Therefore, throughout this document, whenever the term "First Nations" is used, it refers only to First Nations people living off-reserve, and should not be interpreted as relating to First Nations people living on-reserve.

The CCHS is a cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population aged 12 and older living in private dwellings in the 10 provinces and 3 territories. The CCHS excludes individuals living on Indian reserve communities, institutions, full-time members of the Canadian Armed Forces, and residents of remote regions of the country. Further details on the design and sampling frame for the CCHS can be found elsewhere.[23] The CCHS sample used in this study was limited to those aged 20 and older (n=58,957).

As part of the CCHS, respondents were asked, "Are you an Aboriginal person, that is, North American Indian, Métis or Inuit?" Those who answered in the affirmative were excluded from the CCHS sample in the present study (n=2,671). Remaining respondents comprised the non-Aboriginal sample in analyses. The final sample included 56,286 non-Aboriginal adults.

Findings

Aboriginal people more likely to report poorer health outcomes

In general, Aboriginal people were less likely to report being in optimal health than non-Aboriginal people. First Nations, Métis and Inuit adults were all significantly less likely than non-Aboriginal adults to rate their health as excellent or very good or to report having no activity-limiting conditions (Table 1). First Nations and Métis adults were also more likely than non-Aboriginal adults to report that they had been diagnosed with a chronic condition. Conversely, this proportion was significantly lower among Inuit adults (Table 1).

Looking at specific chronic conditions, in almost all cases First Nations and Métis adults were significantly more likely than non-Aboriginal adults to report having been diagnosed by a doctor with the condition (Figure 2). Conversely, Inuit adults were generally less or similarly likely to be diagnosed with a particular condition as compared to non-Aboriginal adults. The exceptions were experiencing the effects of a stroke and stomach or intestinal ulcers, where the prevalence of these conditions was significantly higher for Inuit adults. (See Appendix Table A for crude and age-sex adjusted prevalence rates of self-reported chronic conditions).

It should be noted that the questions regarding the presence of chronic conditions as asked in both the CCHS and the APS specify that the individual be diagnosed with a particular condition by a doctor or health professional. As such, these findings do not necessarily indicate that these individuals did not have these conditions; rather, they have not received a specific diagnosis from a doctor or health professional.

Table 1
Self-reported health characteristics, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

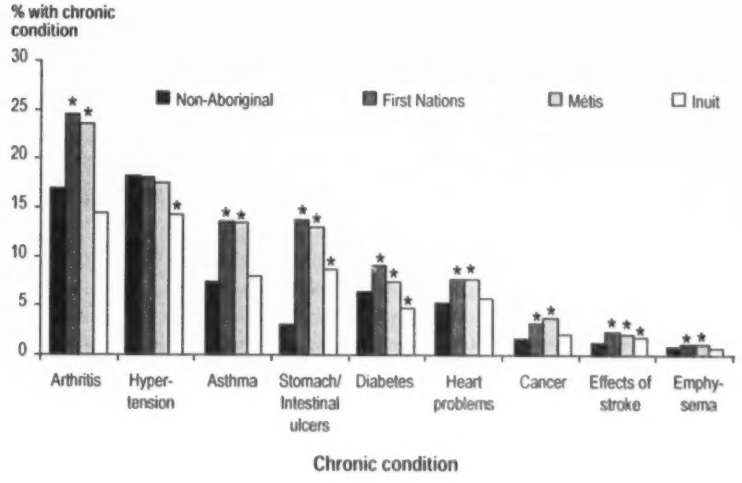
Health characteristics	Non-Aboriginal (n=56,286)	First Nations (n=8,767)	Métis (n=7,279)	Inuit (n=4,040)
			percentage	
Excellent or very good health	58.7	51.3*	56.7*	49.2*
No activity limitations	74.0	58.3*	59.1*	64.2*
Any diagnosed chronic conditions†	46.0	50.5*	50.4*	38.7*

* significantly different from estimate for non-Aboriginal (p<.05)

† reporting a diagnosis of at least one of: arthritis, asthma, cancer, diabetes, emphysema, heart problems, hypertension (high blood pressure), effects of stroke, stomach or intestinal ulcers

Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Figure 2
Prevalence of diagnosed chronic conditions, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



* significantly different from estimate for non-Aboriginal (p< 0.05)

Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

The case of diabetes

Although not the most commonly reported chronic condition, diabetes was significantly more prevalent among First Nations (9.3%) and Métis (7.5%) adults than among non-Aboriginal adults (6.5%) (Table 2). Conversely, diabetes was significantly less prevalent among Inuit adults (4.9%). Diabetes is a risk factor for reductions in functional health, while it also increases the risk of premature death. Complications due to diabetes may also result in blindness, amputation, ischemic heart disease, stroke and kidney failure.[24]

Diabetes is often broken down into types. Type 1 diabetes, sometimes referred to as insulin-dependent diabetes or juvenile diabetes, is a condition when the body produces little to no insulin and is usually diagnosed in children or young adults. Type 2 diabetes, sometimes referred to as non-insulin-dependent diabetes or adult-onset diabetes, is the most common form of the condition and occurs when the body cannot properly use the insulin it produces or cannot produce sufficient insulin. Type 2 diabetes is usually diagnosed in adulthood, although it can occur during childhood, and is generally treated through diet and exercise.[24]

Table 2
Characteristics of individuals diagnosed with diabetes, by Aboriginal identity group, off-reserve population aged 20 and older, Canada, 2006/2007

Health characteristics	Non-Aboriginal	First Nations	Métis	Inuit
Diagnosed with diabetes, percentage (n)	6.5 (4,443)	9.3* (862)	7.5* (522)	4.9* (169)
Age at diagnosis, mean (standard error)	50.8 (0.4)	44.0 *(0.8)	43.9* (0.8)	46.4* (1.8)
Type of diabetes, percentage				
Type 1	4.2†	13.4*	13.5*	18.2*
Type 2	87.7†	64.7*	69.3*	35.8*
Gestational only	0.5†	4.8*	2.2*	4.0*
Pre-diabetic/ Borderline	..	6.5	5.0	6.3
Don't know /Can't determine	7.6†	10.6*	10.0*	35.7*
Treatment, percentage				
Currently use insulin	20.9	24.6	27.8*	17.8
Use other drugs	72.4	81.9*	82.1*	79.8
Special diet	..	24.3	22.1	17.6
Exercise or physiotherapy	..	11.7	13.1	8.3
Traditional remedies	..	2.6	0.9	X
Other	..	8.6	10.0	5.6

* significantly different from estimate for non-Aboriginal ($p<.05$)
† type of diabetes was based on self-report in the APS and derived from an algorithm in the CCHS
.. not available for specific reference period
X suppressed to meet confidentiality requirements of *Statistics Act*
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

between ages 20 and 39 (21.1% vs. 14.1%) than were non-Aboriginal respondents (Figure 3). Furthermore, nearly a third of First Nations adults living off-reserve were diagnosed between the ages of 20 and 39. Conversely, whereas nearly a third (31.1%) of non-Aboriginal adults with diabetes were diagnosed with the condition at or after age 60, significantly fewer Aboriginal diabetics were diagnosed with the condition at later ages.

The proportion of adults using insulin for the treatment of diabetes was higher among Métis (27.8%) than among non-Aboriginal adults (20.9%; Table 2). The majority of individuals reported using some other form of medication to treat their diabetes, although the proportions were significantly higher for First Nations (81.9%) and Métis (82.1%) adults with diabetes than for non-aboriginal adults with the condition (72.4%; Table 2).

Gestational diabetes is diagnosed during pregnancy, usually around the 24th week of pregnancy. Although gestational diabetes resolves after the birth of the baby, approximately 40% of women who are diagnosed with gestational diabetes go on to develop Type 2 diabetes later in life.[25]

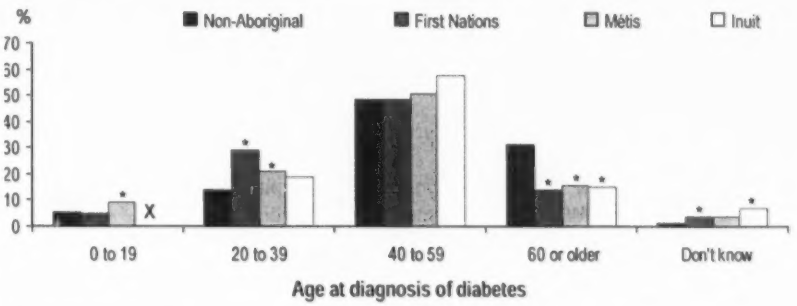
The 2006 APS included information on the type of diabetes with which individuals were diagnosed, whereas the CCHS, for the most part, did not. However, type of diabetes could be imputed in the CCHS using other reported information (see *Methods*). Compared with non-Aboriginal diabetics, a significantly higher proportion of Aboriginal diabetics were diagnosed as Type 1, while a significantly lower proportion of Aboriginal diabetics were diagnosed as Type 2 (Table 2). Gestational diabetes was also significantly more common among First Nations, Métis and Inuit women than among non-Aboriginal women.

Among those with diabetes, Aboriginal adults were diagnosed at significantly younger ages than were non-Aboriginal adults (Table 2). When broken down into smaller age groups, Métis were significantly more likely than non-Aboriginal respondents to report being diagnosed with diabetes prior to age 20 (8.9% vs. 5.2%) or

Accessing health professionals

While more than three-quarters of Aboriginal and non-Aboriginal respondents indicated that they had seen or talked to a doctor or nurse in the past year, proportions were significantly lower among First Nations, Métis and Inuit adults than they were among non-Aboriginal adults (Table 3). Although this represents relatively high levels of contact with doctors or nurses, the sources of care differed dramatically. Inuit, Métis and First Nations people living off-reserve were significantly less likely to have seen or talked to a family

Figure 3
Percentage distribution of age at diagnosis of diabetes, by age group and Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



* significantly different from estimate for non-Aboriginal ($p< 0.05$)
X suppressed to meet confidentiality requirements of *Statistics Act*
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table 3
Accessing health care professionals and absence from home due to illness, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

Access to health care professional / Absence from home	Non-Aboriginal (n=56,286)	First Nations (n=8,767)	Métis (n=7,279)	Inuit (n=4,040)
			percentage	
Saw doctor or nurse in past year	78.8	77.6*	75.4*	77.5*
Saw family doctor	77.4	73.9*	73.1*	55.3*
Saw nurse	11.2	30.5*	26.2*	63.2*
Away from community for more than 1 month because of illness	..	2.9	2.0	5.2

* significantly different from estimate for non-Aboriginal (p<.05)
.. not available for specific reference period
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

doctor in the past year, but were significantly more likely to have seen or talked to a nurse, than were non-Aboriginal people (Table 3). The difference was particularly marked for Inuit, where 55% of Inuit saw or talked to a doctor and 64% saw or talked to a nurse in the past year, compared to 77% and 11% of non-Aboriginal respondents, respectively (Table 3). What cannot be discerned from these data is whether or not the meeting with a health professional occurred face-to-face or over the telephone.

When specific health care services are unavailable in a community, it may be necessary for a person to be moved to another location in order to have access to the necessary services. In the APS, respondents were asked if they had been away from home for a period of a month or more and, if so, the reason for such an absence. Three percent of First Nations adults, 2% of Métis adults, and more than 5% of Inuit adults indicated that they had been absent from their home for a month or more in the past 12 months due to illness (Table 3).

Socio-economic and demographic profiles differ

While there are large health disparities for First Nations, Métis and Inuit adults, there are other important differences between these groups and non-Aboriginal adults in Canada. In general, Aboriginal people were younger, more likely to have less than a high school education, and more likely to have lower personal incomes than non-Aboriginal people (Table 4). While more than 2 out of 5 non-Aboriginal adults reported a personal income of $40,000 or more per year, a similar proportion of Métis, and more than half of First Nations and Inuit adults reported personal incomes less than $20,000 a year (Table 4). Furthermore, while nearly 60% of non-Aboriginal adults reported having a postsecondary degree, this proportion was significantly lower for First Nations (39.5%), Métis (44.3%) and Inuit (27.8%) adults.

There was also a differential pattern of residence across the country. First Nations adults living off-reserve were more likely to live in the Western provinces than were non-Aboriginal adults (46.8% vs. 29.3%). Métis were more likely to live in the Prairie provinces (47.6%), while Inuit were more likely to inhabit the Territories (53.3%) and the northern parts of Québec and Newfoundland and Labrador, which comprise the Inuit land claims regions. Furthermore, while the majority of non-Aboriginal respondents lived in urban areas (82.1%), the proportion of Aboriginal adults living in urban areas was significantly lower (Table 4). This was particularly true among Inuit, where the majority of individuals (78.5%) lived in rural or Arctic communities.

These geographic differences may be important determinants of health in that health care delivery can vary greatly by region. For example, none of the 52 Inuit communities in the North have year-round road access, and only a few have hospitals.[12] In addition, many northern

Table 4
Demographic and socio-economic characteristics, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

Demographic / Socio-economic characteristics	Non-Aboriginal (n=56,286)	First Nations (n=8,767)	Métis (n=7,279)	Inuit (n=4,040)
Mean age (standard error)	47.2 (0.1)	42.2 (0.2)*	42.4 (0.2)*	39.7 (0.3)*
Male, percentage	49.0	42.9 *	46.5 *	47.7
Education, percentage				
Less than secondary graduation	16.0	27.8 *	22.6 *	47.5 *
Secondary graduation	16.4	15.3	17.0	10.5*
Some postsecondary	7.8	17.4 *	16.2 *	14.3 *
Postsecondary graduation	59.8	39.5 *	44.3 *	27.8 *
Personal income, percentage				
Less than $10,000	12.4	25.6 *	20.1*	27.1 *
$10,000 to $19,999	16.4	26.0*	22.1*	25.0 *
$20,000 to $29,999	15.2	15.0	16.7 *	14.2
$30,000 to $39,999	14.3	11.7 *	13.1 *	10.0 *
$40,000 to $59,999	20.2	12.3 *	15.7 *	11.5 *
$60,000 or more	21.4	9.5 *	12.2 *	12.3 *
Region of residence, percentage				
Atlantic	7.2	7.7 *	5.5 *	14.8 *
Québec	24.2	10.7 *	9.8 *	20.7 *
Ontario	39.2	31.2 *	20.9 *	4.5 *
Prairies	15.8	29.1 *	47.6 *	4.8 *
British Columbia	13.5	17.7 *	15.3 *	1.9 *
Territories	0.2	3.7 *	1.0 *	53.3 *
Urban residence†, percentage	82.1	76.1 *	71.1 *	21.5 *

* significantly different from estimate for non-Aboriginal (p<.05)
† records from 2006 Aboriginal Peoples Survey designate place of residence as urban, rural or Arctic (in Inuit Nunangat); to maintain comparability between data sources in this study, place of residence was dichotomized as urban or rural/Arctic
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

or isolated communities find it difficult to recruit and retain health care professionals.[26] Furthermore, areas with a greater population density often have greater access to health care providers and medical resources. As such, many northern and isolated communities lack adequate health care access. Conversely, certain provinces (Newfoundland and Labrador, Québec) provide more physicians and medical facilities per capita than others.[26] Therefore, geography can be viewed as an important determinant of health in terms of access to services.

Other aspects of a person's living environment can also significantly impact their health. Among Aboriginal people, 14% of First Nations adults living off-reserve felt that their water at home was not safe to drink. By comparison, nearly 12% of Métis adults and 15% of Inuit adults felt the same (Table 5). Furthermore, almost 1 in 5 First Nations adults living off-reserve (18.9%) and Métis adults (17.9%) said that their drinking water was contaminated during certain times of the year. This figure rose to more than one-third (35.9%) of Inuit adults.

Methods

Descriptive statistics (proportions, means) were compared using Z- and t-tests for independent samples. Because of differences in methodologies for constructing bootstrap weights between the two surveys, regression models that included both Aboriginal and non-Aboriginal respondents were sample weighted but not bootstrapped. This may result in variance estimates that are artificially small; therefore a more conservative p-value (0.01) was used in such analyses when determining statistical significance of estimates. However, proportions, means and regression models that were run separately for each Aboriginal identity group were bootstrapped using appropriate methodologies.

Sequential regression models: Interpreting odds ratios and the order of variable selection

The sequential model analysis examined the cumulative impact of various socio-economic, lifestyle and health care access factors on the health of First Nations, Métis and Inuit adults relative to that of non-Aboriginal adults. This impact is seen through the use of odds ratios, which compare the odds of a particular outcome for First Nations, Métis or Inuit adults relative to non-Aboriginal adults after taking other factors into account. Because non-Aboriginal adults form the reference group, their default value is 1.0, which is depicted by a horizontal line in Figures 4 through 8. In these figures, odds ratios (bars) and their associated 99% confidence intervals that do not include the value of 1.0 – or overlap the horizontal line – indicate that the odds of the health-related outcomes are significantly different from non-Aboriginal adults for First Nations, Métis or Inuit adults.

Although variables could have been added to the models in a number of ways, the rationale for the sequence of variables is as follows. Step 1 variables included age and sex, as age is known to vary between non-Aboriginal and Aboriginal populations and age and sex are known to be closely associated with health. Step 2 variables included income and education, as one of the objectives of this study was to determine whether health disparities between Aboriginal and non-Aboriginal adults were due to socio-economic differences. The three remaining steps in the model-building moved from individual (i.e. smoking status and BMI category) to contextual (i.e. urban place of residence) factors to take into account the broader determinants of health. The order chosen could impact the estimates from intermediary (steps 1 though 4) models, but estimates from step 5 would be the same regardless of the order of variable inclusion.

Determining diabetes type in the CCHS

In the 2007 CCHS cycle 4.1, respondents who indicated that they had been diagnosed with diabetes were not asked with what type of diabetes they had been diagnosed. However, using other information available in the survey, it is possible to use the Ng-Dasgupta-Johnson algorithm[27] to impute diabetes type.

This seven-step algorithm determines diabetes type using the following information: whether diabetic women had been diagnosed with diabetes other than when pregnant; whether pills were used in the past month for the treatment of diabetes; whether the respondent was currently taking insulin; the individual's age at diagnosis of diabetes; the time between diagnosis and initiation of insulin treatment; and the respondents age at the time of interview.

In the final step of the Ng-Dasgupta-Johnson algorithm, diabetics that had not been classified to a diabetes type category in the previous steps were classified as Type 2. To maintain comparability with the information provided in the APS, where diabetics are allowed to indicate that they do not know their type of diabetes, CCHS diabetics that had not been otherwise classified by the seventh step were assigned a diabetes typology of "can't determine." Therefore, the rate of Type 2 diabetes presented in this report may differ from that reported by others using the same data source.

For further details on methods used in this study, see *Technical notes*.

Table 5
Drinking water and housing conditions, by Aboriginal identity group, off-reserve Aboriginal identity population aged 20 or older, Canada, 2006/2007

Drinking water / Housing	First Nations (n=8,767)	Métis (n=7,279)	Inuit (n=4,040)
		percentage	
Water at home not safe for drinking	14.1	11.9*	14.8
Water contaminated certain times of year	18.9	17.9	35.9*
Dwelling in need of major repair	15.0	13.0*	25.5*
Dwelling overcrowded	3.2	1.9*	23.7*

* significantly different from estimate for First Nations (p<.05)
Sources: 2006 Aboriginal Peoples Survey.

Smoking and body mass index

Other known health risk factors include smoking and obesity. Smoking is known to increase the likelihood of developing numerous chronic health conditions as well as reduce an individual's life expectancy.[28,29] In the present study, daily smoking was significantly more prevalent among Aboriginal adults than among non-Aboriginal adults (Table 6). This was particularly true among Inuit, where 60% of adults reported smoking on a daily basis.

Excess body weight has also been associated with poorer health and reduced life expectancy.[30-34] The body mass index (BMI) is often used as an indicator of excess weight and is classified into four categories: (i) underweight (BMI<18.5), (ii) acceptable weight (18.5≤BMI<25), (iii) overweight (25≤BMI<30), and (iv) obese (BMI≥30). Based on self-reported height and weight, First Nations (27.5%), Métis (27.6%) and Inuit adults (25.4%) were significantly more likely to be obese than non-Aboriginal Canadians (16.9%). However, for various reasons, these cut-points may not be appropriate for use in Aboriginal populations (see Note to Table 6).

Income and education explain some but not all differences in health status

Because of the differences in socio-economic characteristics, one may question whether the health inequalities between Aboriginal and non-Aboriginal people may be minimized or erased if these differences were taken into account. To address this question, we used (logistic) regression models to examine the differences in health-related outcomes for First Nations people off-reserve, Métis and Inuit adults compared to non-Aboriginal adults both before and after controlling for various socio-economic and lifestyle factors.

Sequential models for general health status

The unadjusted model confirms what was found descriptively, namely that First Nations off-reserve, Métis and Inuit adults were all significantly less likely than non-Aboriginal adults to report being in excellent or very good health (Figure 4, unadjusted). After accounting for the effects of age and sex, this health discrepancy was even greater (Figure 4, step 1). This is due to the fact that, for Aboriginal and non-Aboriginal adults of a given age, Aboriginal adults were significantly less likely to report being in excellent or very good health. After adjusting for the effects of income and educational attainment (Figure 4, step 2), odds ratios were closer to, but still significantly lower than 1. However, other factors may also explain differences in health status. Further adjusting for daily smoking and body mass index rendered the odds of being in excellent or very good health for Métis and Inuit adults similar to that of non-Aboriginal adults, but not so for First Nations adults living off-reserve (Figure 4, step 3). Adjusting for having seen or talked to a doctor or nurse in the12 months prior to survey had little to no impact on the disparity between First Nations adults living off-reserve and non-Aboriginal adults (Figure 4, step 4), nor did taking into account living in an urban centre (Figure 4, step 5). After all adjustments, Métis and Inuit adults were as likely as non-Aboriginal adults to report being in excellent or very good health, while First Nations adults living off-reserve remained significantly less likely to do so. This indicates that, for First Nations people, other factors still account for the health inequities observed. Coefficients from the sequential step-wise models can be found in Appendix Table C.

Table 6
Current daily smoking and body mass index, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

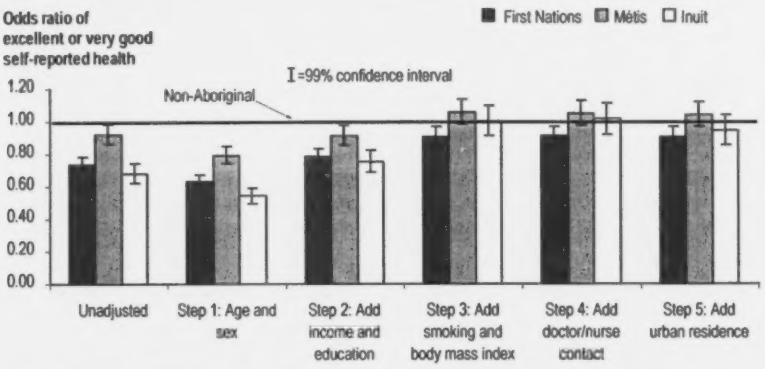
Smoking / BMI	Non-Aboriginal (n=56,286)	First Nations (n=8,767)	Métis (n=7,279)	Inuit (n=4,040)
			percentage	
Current daily smoker	18.3	35.8*	33.0*	59.8*
Body mass index				
Under-/Acceptable weight	48.4	37.1*	36.0*	38.6*
Overweight	34.7	35.4	36.4*	36.1*
Obese	16.9	27.5*	27.6*	25.4*

* significantly different from estimate for non-Aboriginal (p<.05)
Note: Body mass index may not be an appropriate measure for Aboriginal people, particularly Inuit.[35-37] Therefore, the prevalence of overweight and obesity among Inuit should be interpreted cautiously.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Sequential models for likelihood of being diagnosed with at least one chronic condition

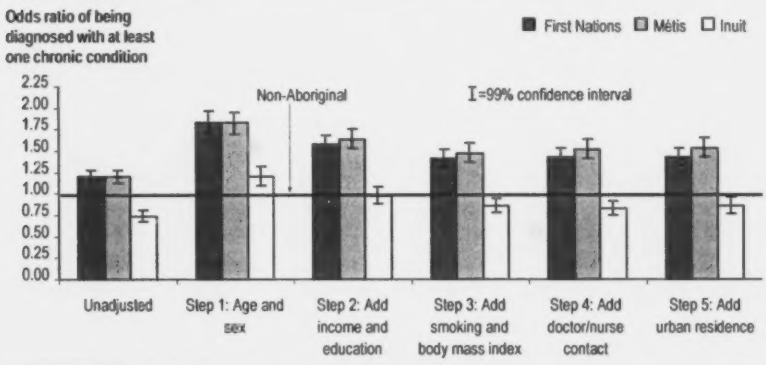
A somewhat different pattern emerges when we examine the likelihood of being diagnosed by a doctor with at least one of 9 chronic conditions: arthritis, asthma, cancer, diabetes, emphysema, heart problems, hypertension (high blood pressure), effects of a stroke, and stomach or intestinal ulcers. While adjusting for age and sex further exacerbates the disparities

Figure 4
Odds ratios showing unadjusted and cumulative effects of socio-economic, lifestyle and health care access factors on being in excellent or very good health, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



Note: Reference group is non-Aboriginal adults denoted by horizontal line.
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Figure 5
Odds ratios showing unadjusted and cumulative effects of socio-economic, lifestyle and health care access factors on being diagnosed with at least one chronic condition, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



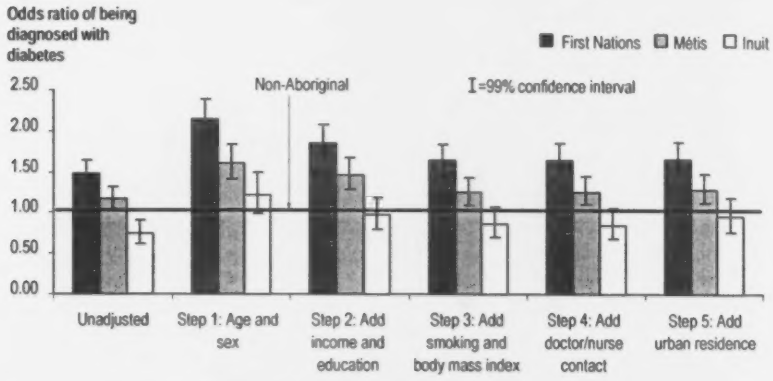
Note: Reference group is non-Aboriginal adults denoted by horizontal line.
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

between First Nations adults living off-reserve, Métis adults and non-Aboriginal adults, this adjustment clarifies that, for Inuit and non-Aboriginal adults of the same age, Inuit adults are significantly more likely to have been diagnosed with at least one chronic condition (Figure 5, step 1). This was not clear from simple descriptive statistics that did not take into account the different age structures of these populations (Table 1). Further adjusting for income and educational attainment in step 2 brought all groups closer to parity with the non-Aboriginal population. In fact, this adjustment rendered any differences in the likelihood of being diagnosed with a chronic condition between Inuit and non-Aboriginal adults statistically non-significant. Further adjustments for smoking and body mass index (Figure 5, step 3), having seen or spoken to a doctor or nurse in the past year (Figure 5, step 4) or living in an urban location (Figure 5, step 5) resulted in small changes towards parity with non-Aboriginal adults for First Nations off-reserve and Métis adults, although their odds of being diagnosed with a chronic conditions remained significantly higher than that of non-Aboriginal adults. For Inuit adults, adjusting for these factors resulted in significantly lower odds of being diagnosed with a chronic condition compared to non-Aboriginal adults. As previously noted, the wording of the questions involved in this analysis required that the individual be diagnosed by a doctor. As such, this analysis does not indicate that these individuals did not have these conditions, but rather that they had not been diagnosed as such. Coefficients from the sequential step-wise models can be found in Appendix Table E.

Sequential models for diabetes, asthma and arthritis

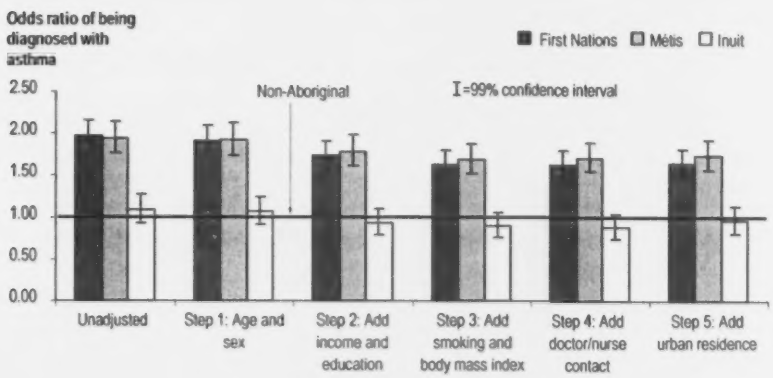
Rather than examine the odds of having one of several chronic conditions, we also examined the odds of being diagnosed with three specific chronic conditions: diabetes (Figure 6), asthma (Figure 7), and arthritis (Figure 8). Unadjusted prevalence rates of these conditions indicated that First Nations and Métis adults were significantly more likely than non-Aboriginal adults to have been diagnosed with each of diabetes, asthma and arthritis. Conversely, Inuit adults were significantly less likely to have been diagnosed with diabetes or arthritis, but were equally as likely to have been diagnosed with asthma, as non-Aboriginal adults. After adjusting for the different age distributions between these populations (step 1), the likelihood of being diagnosed with diabetes for the Inuit population was similar to that in the non-Aboriginal population (Figure 6), whereas the likelihood of being diagnosed with arthritis exceeded that for non-Aboriginal adults (Figure 8). In the case of each condition, while adjusting for socio-economic (income and education), lifestyle (smoking and body mass index), access to health professionals (having seen a doctor or nurse in the past year) and place of residence (urban) eliminated

Figure 6
Odds ratios showing unadjusted and cumulative effects of socio-economic, lifestyle and health care access factors on being diagnosed with diabetes, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



Note: Reference group is non-Aboriginal adults denoted by horizontal line.
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Figure 7
Odds ratios showing unadjusted and cumulative effects of socio-economic, lifestyle and health care access factors on being diagnosed with asthma, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



Note: Reference group is non-Aboriginal adults denoted by horizontal line.
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

any differences between Inuit and non-Aboriginal adults in the likelihood of being diagnosed with the condition, First Nations and Métis adults remained significantly more likely to be diagnosed with these conditions. Coefficients from the sequential step-wise models are found in Appendix Tables G, I and K for diabetes, asthma, and arthritis, respectively.

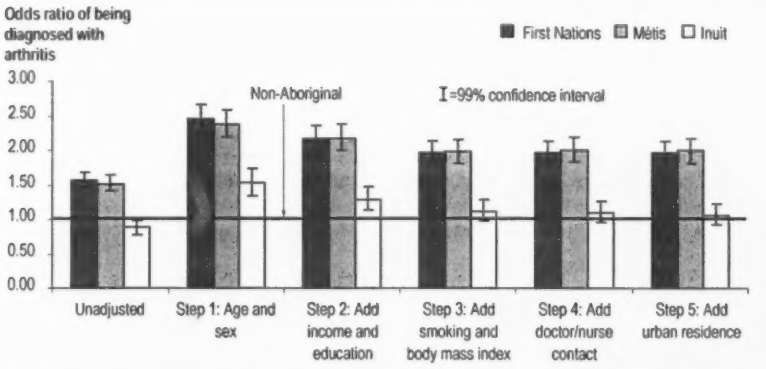
Factors associated with health outcomes different for Aboriginal and non-Aboriginal adults

From the previous sequential step-wise models, it was shown that certain health disparities between Aboriginal and non-Aboriginal people could be diminished, but not necessarily eliminated, by controlling for the effect of various socio-economic and demographic factors. However, the impact of these factors may not be the same across Aboriginal identity groups. Initial analyses found several significant interactions of these factors with Aboriginal identity in the models. Therefore, separate models for each identity group were run and estimates across models were compared (for technical description of analysis methodology, see *Technical notes*).

Logistic models were conducted separately for each Aboriginal identity group (non-Aboriginal, First Nations off-reserve, Métis and Inuit) to estimate the likelihood of reporting each of the previously examined health outcomes: excellent or very good general health (Table 7), diagnosed by a health professional with one of several chronic conditions (Table 8), diagnosed with diabetes by a health professional (Table 9), diagnosed with asthma by a health professional (Table 10), and diagnosed with arthritis by a health professional (Table 11).

The majority of factors seemed to have similar effects across models for each of the health outcomes. However, a few factors stood out as having different effects according to Aboriginal identity group. One such factor was gender. Among non-Aboriginal adults, men were significantly less likely than women (OR=0.9) to report being in excellent or very good health (Table 7). Conversely, for First Nations, Métis and Inuit adults, men and women were similarly likely to report being in excellent or very good health. The estimates for First Nations and Inuit adults differed significantly from the model for non-Aboriginal adults (Table 7). Furthermore, whereas non-Aboriginal men and women were equally as likely to have been diagnosed by a doctor with at least one chronic condition (OR=1.0), men were significantly less likely to be diagnosed with a chronic condition than women among

Figure 8
Odds ratios showing unadjusted and cumulative effects of socio-economic, lifestyle and health care access factors on being diagnosed with arthritis, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007



Note: Reference group is non-Aboriginal adults denoted by horizontal line.
Source: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

First Nations (OR=0.8), Métis (OR=0.8) and Inuit (OR=0.7) adults (Table 8). And while non-Aboriginal men were significantly more likely to have been diagnosed with diabetes than women, Aboriginal men and women were equally as likely to have been diagnosed with the condition, whether First Nations (OR=1.0), Métis (OR=1.2) or Inuit (OR=0.9) adults (Table 9).

Across the five outcomes examined, body mass index categories had differential effects across Aboriginal identity groups on three outcomes: self-rated health (Table 7), being diagnosed with at least one chronic condition (Table 8), and being diagnosed with arthritis (Table 11). In these models, the effects of overweight and obesity categories were different from the effects among non-Aboriginal adults for First Nations and Inuit

Limitations

Unlike the CCHS, the APS was not designed as a health survey, but rather as an omnibus survey. As such, the number and scope of questions related to health in the APS were limited. Other more specific health-related measures may have better described the health status of Aboriginal people. However, a number of the health-related questions on the APS were comparable to ones in the CCHS, which allowed for cross-survey comparisons.

Further, other differences between the CCHS and the APS may contribute to significant differences between populations. These may include, but are not necessarily limited to, sampling procedures and interview methodologies. Therefore, significant differences found between samples may be due to differences in survey design and may not necessarily reflect true inter-population differences. However, these effects will likely be minimal when comparisons are made between populations within the APS sample, namely comparisons between Inuit, Métis and First Nations adults living off-reserve.

Relative to the non-Aboriginal sample, the sample of Inuit adults was relatively small. As a result, certain differences may not have reached statistical significance due to power constraints. Nevertheless, the number of Inuit in Canada is itself small, and the sample of Inuit respondents found in the APS is much larger than that found in other general population surveys. The smaller sample also precluded the examination of numerous health measures at the provincial/territorial level, particularly for the Inuit population.

Although the number of Aboriginal respondents available from the APS is much larger than from other surveys, the small sample relative to non-Aboriginal respondents also meant that the samples could not be further subdivided to reflect more specific groups. For example, the sample of First Nations respondents could have been further subdivided into individuals who were Registered (Status) Indians and those who were not. Similarly, Inuit respondents could have been further categorized as living in Inuit Nunangat – the Inuit homeland – or in the south. Although these subdivisions may have highlighted further cross-group differences, the size of the sample precluded such analyses.

All health-related information from the CCHS and the APS was based on self-report. Although much self-reported information has been shown to be valid and reliable, some measures may be biased. However, it is not known whether the potential bias introduced by self-report applies equally to Aboriginal and non-Aboriginal adults, or whether the magnitude or direction of this bias differs by Aboriginal identity group.

Table 7
Adjusted odds ratios relating selected socio-demographic and health-related factors to reporting excellent or very good health, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

	A: Non-Aboriginal (n=56,054)			B: First Nations (n=8,692)			C: Métis (n=7,225)			D: Inuit (n=3,950)		
	Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Male[†]	0.86*[BD]	0.81	0.92	1.15[AC]	1.00	1.32	0.92[B]	0.80	1.05	1.10[A]	0.90	1.34
Personal income												
Less than $10,000	0.55*[D]	0.48	0.61	0.41*[AC]	0.33	0.52	0.63*[B]	0.50	0.79	0.59*	0.43	0.82
$10,000 to $19,999	0.61*[D]	0.55	0.68	0.47*[A]	0.37	0.60	0.59*	0.47	0.75	0.68*	0.48	0.97
$20,000 to $29,999	0.81*	0.73	0.90	0.77	0.60	1.00	0.88	0.69	1.12	0.91	0.64	1.29
$30,000 to $39,999[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	1.07	0.96	1.19	0.98	0.75	1.27	1.32*[D]	1.04	1.67	0.81[C]	0.55	1.21
$60,000 or more	1.46*[D]	1.31	1.62	1.12	0.83	1.51	1.55*[D]	1.19	2.02	0.92[BC]	0.63	1.34
Education												
Less than secondary graduation	0.67*	0.60	0.73	0.66*	0.53	0.83	0.56*	0.45	0.70	0.80	0.59	1.10
Secondary graduation[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	1.00	0.88	1.12	0.98	0.77	1.24	1.02	0.81	1.29	1.30	0.85	2.00
Postsecondary graduation	1.07[B]	0.99	1.16	1.38*[AC]	1.13	1.70	1.04[B]	0.86	1.26	1.11	0.78	1.57
Daily smoker[‡]	0.55*[B]	0.50	0.59	0.67*[AC]	0.58	0.77	0.54*[B]	0.47	0.62	0.60*	0.49	0.74
Body mass index												
Under-/Acceptable weight[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	0.72*[BD]	0.66	0.77	0.88[A]	0.74	1.03	0.71*[D]	0.61	0.84	1.03[BC]	0.81	1.30
Obese	0.41*[BD]	0.38	0.45	0.51*[AC]	0.43	0.61	0.37*[BD]	0.31	0.44	0.67*[BC]	0.51	0.89
Saw doctor or nurse in past year[‡]	0.63*	0.58	0.69	0.55*	0.46	0.65	0.59*	0.50	0.70	0.66*	0.53	0.82
Urban residence[‡]	0.85*	0.80	0.91	0.86*	0.76	0.97	0.88	0.77	1.00	1.17	0.85	1.62

* estimate significantly different from zero (p<.05)
[A] estimate significantly different from non-Aboriginal (p<.05)
[B] estimate significantly different from First Nations (p<.05)
[C] estimate significantly different from Métis (p<.05)
[D] estimate significantly different from Inuit (p<.05)
† reference category
‡ reference category is absence of characteristic
... not applicable

Notes: Linear and quadratic effects of age and missing categories for income, education and body mass index are included in model, but not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

adults, particularly the latter. Such findings may indicate that the BMI cut-points used in the general population may not be appropriate for First Nations or Inuit people, an argument that has been made by others.[35]

In the same way, other characteristics had different health impacts across Aboriginal and non-Aboriginal populations, as well as across First Nations, Métis and Inuit populations.

Table 8
Adjusted odds ratios relating selected socio-demographic and health-related factors to likelihood of being diagnosed with at least one chronic condition, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

	A: Non-Aboriginal (n=56,144)			B: First Nations (n=8,648)			C: Métis (n=7,182)			D: Inuit (n=3,886)		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to
Male[†]	1.03[BCD]	0.96	1.11	0.81*[A]	0.69	0.94	0.83*[A]	0.71	0.96	0.69*[A]	0.55	0.87
Personal income												
Less than $10,000	1.48*	1.28	1.70	1.37*	1.09	1.73	1.42*	1.12	1.80	1.29	0.94	1.77
$10,000 to $19,999	1.41*	1.24	1.61	1.44*	1.12	1.84	1.33*	1.05	1.67	1.22	0.84	1.79
$20,000 to $29,999	1.05	0.92	1.19	1.14	0.87	1.51	1.09	0.84	1.40	1.22	0.84	1.76
$30,000 to $39,999[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	0.88*	0.78	0.99	0.98	0.75	1.27	0.78[D]	0.61	1.00	1.25[C]	0.83	1.88
$60,000 or more	0.78*[D]	0.69	0.88	0.82[D]	0.60	1.10	0.74*[D]	0.57	0.97	1.38[BC]	0.86	2.20
Education												
Less than secondary graduation	1.25*[D]	1.12	1.39	1.33*[D]	1.05	1.69	1.23	0.99	1.53	0.83[D]	0.53	1.27
Secondary graduation[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	1.20*	1.05	1.39	1.35*	1.04	1.75	1.07	0.85	1.35	0.86	0.49	1.51
Postsecondary graduation	0.93	0.85	1.01	1.05	0.83	1.33	1.06	0.87	1.28	0.81	0.48	1.34
Daily smoker[‡]	1.26*[D]	1.16	1.36	1.29*[D]	1.11	1.50	1.35*[D]	1.16	1.57	0.97[BC]	0.76	1.25
Body mass index												
Under-/Acceptable weight[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	1.64*[BD]	1.52	1.76	1.14[A]	0.96	1.36	1.41*[D]	1.20	1.65	0.82[BC]	0.59	1.15
Obese	2.87*[BD]	2.63	3.13	2.12*[A]	1.76	2.55	2.50*[D]	2.09	3.00	1.59*[BC]	1.16	2.19
Saw doctor or nurse in past year[‡]	2.67*	2.43	2.92	2.87*	2.40	3.44	2.66*	2.26	3.14	2.18*	1.63	2.93
Urban residence[‡]	1.00[D]	0.94	1.08	1.24*[A]	1.09	1.40	1.07	0.93	1.23	1.38	0.94	2.03

* estimate significantly different from zero (p<.05)
[A] estimate significantly different from non-Aboriginal (p<.05)
[B] estimate significantly different from First Nations (p<.05)
[C] estimate significantly different from Métis (p<.05)
[D] estimate significantly different from Inuit (p<.05)
† reference category
‡ reference category is absence of characteristic
... not applicable

Notes: Chronic conditions are asthma, arthritis, emphysema, diabetes, high blood pressure, cancer, heart disease, effects of stroke, stomach or intestinal ulcers. Linear and quadratic effects of age and missing categories for income, education and body mass index are included in model, but not shown.

Sources: 2007 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table 9
Adjusted odds ratios relating selected socio-demographic and health-related factors to likelihood of being diagnosed with diabetes, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

	A: Non-Aboriginal (n=56,086)			B: First Nations (n=8,684)			C: Métis (n=7,225)			D: Inuit (n=3,951)		
	Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval		Adjusted odds ratio	95% confidence interval	
		from	to		from	to		from	to		from	to
Male[†]	1.66*[BCD]	1.49	1.84	0.96[A]	0.76	1.21	1.16[A]	0.91	1.49	0.93[A]	0.60	1.43
Personal income												
Less than $10,000	1.11	0.87	1.42	1.42	0.98	2.05	1.50	0.98	2.29	1.51	0.67	3.40
$10,000 to $19,999	1.18	0.95	1.48	1.31	0.90	1.91	1.41	0.95	2.09	0.85	0.39	1.83
$20,000 to $29,999	0.83	0.68	1.03	0.92	0.59	1.42	0.90	0.59	1.38	0.74	0.34	1.63
$30,000 to $39,999[*]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	0.68*	0.54	0.86	0.90	0.61	1.33	0.69	0.44	1.08	0.50	0.19	1.33
$60,000 or more	0.50*[B]	0.40	0.63	1.08[AC]	0.65	1.78	0.48*[B]	0.30	0.78	0.86	0.37	2.00
Education												
Less than secondary graduation	1.27*	1.06	1.52	1.41	0.96	2.03	0.91	0.64	1.30	0.57	0.23	1.42
Secondary graduation[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	0.97[C]	0.75	1.26	0.91	0.59	1.39	0.55*[A]	0.35	0.85	0.85	0.30	2.42
Postsecondary graduation	0.94[D]	0.80	1.11	0.75	0.51	1.10	0.67*	0.48	0.93	0.31*[A]	0.13	0.76
Daily smoker[‡]	0.96	0.83	1.12	1.13	0.88	1.45	1.03	0.79	1.34	0.83	0.53	1.27
Body mass index												
Under-/Acceptable weight[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	1.97*	1.71	2.27	1.92*	1.33	2.77	1.83*	1.23	2.74	1.16	0.51	2.61
Obese	4.64*	4.02	5.35	4.90*	3.58	6.70	5.24*	3.59	7.65	5.14*	2.38	11.13
Saw doctor or nurse in past year[‡]	2.31*[C]	1.80	2.97	2.50*	1.85	3.38	3.69*[A]	2.42	5.63	3.88*	1.78	8.44
Urban residence[‡]	1.27*	1.14	1.42	1.08	0.88	1.32	1.07	0.84	1.35	2.19*	1.11	4.33

* estimate significantly different from zero (p<.05)
[A] estimate significantly different from non-Aboriginal (p<.05)
[B] estimate significantly different from First Nations (p<.05)
[C] estimate significantly different from Métis (p<.05)
[D] estimate significantly different from Inuit (p<.05)
[*] reference category
[†] reference category is absence of characteristic
... not applicable

Notes: Linear and quadratic effects of age and missing categories for income, education and body mass index are included in model, but not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table 10
Adjusted odds ratios relating selected socio-demographic and health-related factors to likelihood of being diagnosed with asthma, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

	A: Non-Aboriginal (n=56,022)			B: First Nations (n=8,698)			C: Métis (n=7,230)			D: Inuit (n=3,957)		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to
Male[†]	0.69*	0.62	0.77	0.64*	0.53	0.79	0.69*	0.56	0.83	0.52*	0.35	0.78
Personal income												
Less than $10,000	1.18[D]	0.97	1.44	1.47*	1.08	1.99	1.16[D]	0.87	1.55	3.07*[AC]	1.78	5.30
$10,000 to $19,999	1.23*[D]	1.01	1.50	1.68*	1.23	2.31	1.25	0.92	1.70	2.83*[A]	1.60	5.00
$20,000 to $29,999	1.17[D]	0.96	1.42	1.23[D]	0.84	1.80	1.14[D]	0.83	1.57	3.22*[ABC]	1.57	6.62
$30,000 to $39,999[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	0.99[D]	0.82	1.21	0.96[D]	0.65	1.41	0.81[D]	0.56	1.16	2.29*[ABC]	1.20	4.34
$60,000 or more	1.01[D]	0.83	1.24	0.78[D]	0.50	1.18	0.71[D]	0.47	1.07	2.35*[ABC]	1.18	4.69
Education												
Less than secondary graduation	1.47*	1.23	1.74	1.12	0.82	1.52	1.20	0.89	1.61	0.90	0.50	1.64
Secondary graduation[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	1.15	0.93	1.42	1.15	0.82	1.62	1.09	0.79	1.50	0.96	0.42	2.23
Postsecondary graduation	1.20*	1.04	1.38	1.10	0.81	1.50	1.15	0.87	1.51	0.97	0.52	1.80
Daily smoker[‡]	1.19*[B]	1.05	1.35	0.89[A]	0.72	1.09	1.11	0.92	1.35	0.83	0.58	1.19
Body mass index												
Under-/Acceptable weight[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	1.29*	1.15	1.45	1.07	0.83	1.39	1.05	0.82	1.34	1.10	0.67	1.80
Obese	1.68*	1.48	1.92	1.58*	1.23	2.02	1.73*	1.36	2.21	1.21	0.77	1.91
Saw doctor or nurse in past year[‡]	1.86*	1.59	2.17	1.72*	1.33	2.22	1.76*	1.37	2.24	1.64	0.95	2.82
Urban residence[‡]	1.11*	1.00	1.23	1.09	0.91	1.30	1.23*	1.02	1.48	1.47*	1.06	2.03

* estimate significantly different from zero (p<.05)
[A] estimate significantly different from non-Aboriginal (p<.05)
[B] estimate significantly different from First Nations (p<.05)
[C] estimate significantly different from Métis (p<.05)
[D] estimate significantly different from Inuit (p<.05)
† reference category
‡ reference category is absence of characteristic
... not applicable

Notes: Linear and quadratic effects of age and missing categories for income, education and body mass index are included in model, but not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table 11
Adjusted odds ratios relating selected socio-demographic and health-related factors to likelihood of being diagnosed with arthritis, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

	A: Non-Aboriginal (n=56,022)			B: First Nations (n=8,698)			C: Métis (n=7,230)			D: Inuit (n=3,957)		
		95% confidence interval			95% confidence interval			95% confidence interval			95% confidence interval	
	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to	Adjusted odds ratio	from	to
Male[†]	0.64*	0.59	0.69	0.65*	0.55	0.77	0.71*	0.60	0.84	0.54*	0.38	0.76
Personal income												
Less than $10,000	1.24*	1.06	1.44	1.54*	1.16	2.05	1.55*	1.18	2.05	1.48	0.93	2.36
$10,000 to $19,999	1.27*	1.11	1.46	1.57*	1.14	2.17	1.37*	1.04	1.81	1.50	0.91	2.46
$20,000 to $29,999	1.01[C]	0.89	1.16	1.05	0.75	1.47	1.40*[A]	1.06	1.85	1.03	0.61	1.75
$30,000 to $39,999[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	0.86*	0.75	0.99	0.98	0.71	1.34	0.76	0.56	1.03	1.31	0.76	2.24
$60,000 or more	0.84*[D]	0.72	0.96	0.70*[D]	0.49	1.00	0.81	0.59	1.12	1.39[AD]	0.63	3.06
Education												
Less than secondary graduation	1.17*	1.05	1.31	1.22	0.94	1.59	1.15	0.89	1.49	0.71	0.36	1.41
Secondary graduation[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	0.99	0.83	1.19	1.18	0.86	1.62	1.00	0.76	1.32	0.66	0.28	1.55
Postsecondary graduation	0.94	0.85	1.04	1.13	0.87	1.46	1.04	0.83	1.31	0.77	0.34	1.76
Daily smoker[‡]	1.50*	0.37	1.64	1.46*	1.23	1.73	1.43*	1.20	1.70	1.20	0.84	1.72
Body mass index												
Under-/Acceptable weight[†]	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	1.36*[D]	1.26	1.47	1.18[D]	0.97	1.44	1.32*[D]	1.08	1.61	0.68[ABC]	0.43	1.07
Obese	1.98*[D]	1.81	2.18	1.58*	1.28	1.96	1.79*[D]	1.47	2.17	1.10[AC]	0.72	1.69
Saw doctor or nurse in past year[†]	1.99*[BD]	1.78	2.22	2.79*[ACD]	2.18	3.56	2.10*[BD]	1.71	2.60	1.17[ABC]	0.75	1.80
Urban residence[‡]	0.86*[BD]	0.80	0.93	1.12[A]	0.96	1.30	0.98[D]	0.84	1.15	1.44[AC]	0.87	2.40

* estimate significantly different from zero (p<.05)
[A] estimate significantly different from non-Aboriginal (p<.05)
[B] estimate significantly different from First Nations (p<.05)
[C] estimate significantly different from Métis (p<.05)
[D] estimate significantly different from Inuit (p<.05)
[†] reference category
[‡] reference category is absence of characteristic
... not applicable
Notes: Linear and quadratic effects of age and missing categories for income, education and body mass index are included in model, but not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Discussion and conclusions

In general, the health of Aboriginal adults is poorer than that of non-Aboriginal adults. Inuit, Métis and First Nations adults living off-reserve were less likely to report being in excellent or very good health and were more likely to report at least one activity limitation than were non-Aboriginal adults. There were also differences in the likelihood of being diagnosed with several or specific chronic health conditions. These health gaps were further exacerbated after taking into account the younger average age structure of the Aboriginal population.

This health gap is narrowed in certain cases after taking into account socio-economic characteristics such as income and educational attainment. However, in most cases, Inuit, Métis and First Nations adults living off-reserve remained in poorer health than non-Aboriginal adults even after socio-economic, health care access and lifestyle risk factors were taken into account.

The fact that health inequalities remain for Aboriginal people relative to non-Aboriginal Canadians indicates that other factors are at play. Some have argued that proximal factors – factors that have a direct impact on health – such as behaviour and socio-economic characteristics are limited in their ability to explain health disparities. Rather, factors that have an indirect effect on health, such as the health care system and, more specific to Aboriginal people in Canada, factors of racism and social exclusion may play an important role in generating and maintaining health inequalities.[36,37] Such factors are, however, difficult to conceptualize and measure and were, therefore, not addressed in the present study.

The fact that income and education levels could not fully explain the differences in health status between Aboriginal and non-Aboriginal adults is not an indication that these factors are unimportant. Low income and education have been shown, in this study and in others,[19-21,38] to be associated with poorer health outcomes. At a very basic level income is reflective of one's ability to access resources, and those with higher incomes generally have access to higher quality resources. Such resources may include high-quality housing, transportation, adequate nutrition, and access to clean water, all of which can impact health. Achieving higher education may increase one's knowledge of healthy lifestyles and of the health care system and how to navigate it.

This study also demonstrated that factors typically associated with health in the general population do not act in the same way for First Nations, Métis and Inuit adults. For example, male gender was significantly associated with higher rates of diabetes in the non-Aboriginal population. However, there was no difference in the likelihood of being diagnosed with diabetes among men and women for First Nations, Métis and Inuit adults. There were also differences among First Nations, Métis and Inuit groups in relation to various measures of health. Such findings indicate several things. First, the factors associated with health among non-Aboriginal adults are not necessarily the same factors that affect the health of Aboriginal people, nor do these factors have the same effect on health. Second, there are also important differences between First Nations, Métis and Inuit adults in terms of the factors that impact health, which highlights the importance of examining these identity groups separately and not using a pan-Aboriginal approach when examining health.

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Technical notes

Both the CCHS and the APS include sample weights that allow the analyst to calculate estimates that are generalizable to the larger population. Each survey also employs the use of bootstrap weights to adjust variance estimates for the complexities of each survey's design. However, the number and nature of replicates differ between the two surveys. The CCHS employs 500 replicate weights, whereas the 2006 APS employs 1000 replicate weights. Furthermore, variance estimation using the 2006 APS bootstrap weights must be adjusted using Fay's factor, whereas this is not the case when using CCHS data. Given that these inter-survey differences could not be addressed in a single model or test, other methods were used in analyses that required comparisons between Aboriginal and non-Aboriginal respondents (e.g. comparing proportions or means), or analyses that were based on a single model that included both the Aboriginal and non-Aboriginal samples.

Calculating and comparing descriptive statistics

Descriptive statistics (proportions, means) were calculated separately for Aboriginal and non-Aboriginal respondents, using the appropriate sample and bootstrap weights for the particular survey. To compare proportion estimates between Aboriginal and non-Aboriginal respondents, the following equations were used:

$$Z = \frac{p_1 - p_2}{\sqrt{se_{p1}^2 + se_{p2}^2}}$$

where p_1 and p_2 are the proportions from each sample and se_{p1} and se_{p2} are the standard errors of the proportions.

To compare mean estimates between Aboriginal and non-Aboriginal respondents, the following equations were used:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{se_{\bar{x}_1}^2 + se_{\bar{x}_2}^2}}$$

where $\bar{x}_1$ and $\bar{x}_2$ are the mean estimates from the two independent samples, $se_{\bar{x}_1}$ and $se_{\bar{x}_2}$ are the standard error estimates of the two means.

Comparing estimates from a single logistic regression model

For certain analyses, CCHS and APS data were included in a single model in order to compare the relative impact of Aboriginal identity on a particular outcome. In such analyses where the model included both Aboriginal and non-Aboriginal respondents, models were weighted using a normalized sampling weight. In lieu of bootstrapping the model, which would normally adjust variance estimates to account for the complex survey design but could not be undertaken due to the aforementioned differences in the number and nature of bootstrap weights for the two surveys, a more conservative alpha value ($p<.01$) was used to identify effects that were considered statistically significant. As such, rather than reporting 95% confidence intervals, 99% confidence intervals are reported from such analyses in this report.

Comparing estimates from separate logistic regression models

A series of analyses in this report involved examining whether socio-economic characteristics or lifestyle behaviours had similar impacts on measures of health for both Aboriginal and non-Aboriginal adults. This was accomplished by comparing logistic coefficients (or their related odds ratios) across independent samples. An often ignored issue when making such comparisons is that residual variation may not be distributed in the same manner across independent samples.[39,40] If residual variation does differ across samples, then apparent differences in coefficients may be due to differences in residual variation and not due to true differences in effect between the two samples.

To address this issue, analyses were run in several ways. First, logistic models were run separately for each Aboriginal identity group (non-Aboriginal, First Nations off reserve, Métis, Inuit) using the appropriate sample and bootstrap weights and procedures for the particular survey. Such analyses were run in SAS-callable SUDAAN (version 10). The odds ratios generated from these models are shown in Tables 7 through 11.

Next, to address the issue of differences in residual variation, and to enable testing for significant differences in effects across models, models were re-run using the software program Mplus (version 4.1). Using theta parameterization options, the residual variation was fixed to be equal across all models. With residual variation now equal across models, it was possible to compare the resultant coefficients to examine true differences in effect across samples. Coefficients were compared across models using the following formula:

$$Z = \frac{\beta_{1A} - \beta_{1B}}{\sqrt{SE\beta_{1A} + SE\beta_{1B}}}$$

where β_{1A} and β_{1B} represent the coefficients for the effects of the same characteristic in samples A and B, respectively, and where $SE\beta_{1A}$ and $SE\beta_{1B}$ are the standard errors of these same coefficients. Tests of significance where $p<.05$ are denoted by superscripts in Tables 7 through 11.

Appendix

Table A
Unadjusted and age-sex-standardized prevalence of diagnosed chronic conditions, by Aboriginal identity group, off-reserve population aged 20 or older, Canada, 2006/2007

Chronic conditions	Non-Aboriginal	Unadjusted			Age-sex-standardized†		
		First Nations	Métis	Inuit	First Nations	Métis	Inuit
	percentage						
Arthritis	16.9	24.3*	23.6*	15.2	27.7*	27.6*	20.7*
Asthma	7.4	13.7*	13.5*	8.1	13.3*	13.3*	9.5*
Cancer	1.7	3.2*	3.7*	2.3	4.0*	4.4*	3.3*
Diabetes	6.5	9.3*	7.5*	4.9*	11.4*	9.5*	7.6
Emphysema	0.8	1.1*	1.3*	0.7	1.4*	1.7*	1.2
Heart problems	5.3	7.5*	7.8*	5.9	9.5*	9.8*	8.6*
Hypertension	18.2	17.9	17.9	14.5*	21.8*	21.7*	20.0
Effects of stroke	1.3	2.5*	2.2*	2.0*	3.5*	2.9*	3.3*
Stomach/Intestinal ulcers	3.1	13.7*	12.9*	8.7*	14.6*	13.8*	9.9*

* significantly different from estimate for non-Aboriginal (p<.05)
† standardized to age and sex structure of non-Aboriginal population
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table B
Unadjusted and adjusted odds ratios relating Aboriginal identity and selected characteristics to reporting excellent or very good health, off-reserve population aged 20 or older, Canada, 2006/2007

	First Nations			Métis			Inuit		
	Odds ratio	99% confidence interval		Odds ratio	99% confidence interval		Odds ratio	99% confidence interval	
		from	to		from	to		from	to
Unadjusted	0.74*	0.70	0.78	0.92*	0.86	0.98	0.68*	0.63	0.74
Adjusted for :									
Age and sex	0.63*	0.59	0.67	0.79*	0.74	0.85	0.54*	0.50	0.59
plus income	0.72*	0.67	0.76	0.86*	0.80	0.92	0.62*	0.56	0.67
plus education	0.71*	0.67	0.76	0.87*	0.81	0.93	0.71*	0.64	0.77
plus daily smoker	0.69*	0.65	0.73	0.86*	0.80	0.92	0.69*	0.63	0.75
plus body mass index	0.68*	0.64	0.73	0.87*	0.81	0.93	0.60*	0.55	0.66
plus saw doctor/nurse in past year	0.63*	0.59	0.67	0.79*	0.74	0.84	0.54*	0.50	0.59
plus urban residence	0.63*	0.59	0.67	0.79*	0.74	0.84	0.54*	0.49	0.59

* significantly different from estimate for non-Aboriginal (p<.01)
Notes: Models used to demonstrate univariate associations include Aboriginal group identifiers, age, sex and variable(s) listed in the row.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table C
Adjusted odds ratios from sequential step-wise logistic regression models for reporting excellent or very good health, off-reserve population aged 20 or older, Canada, 2006/2007

	Step 1			Step 2			Step 3			Step 4			Step 5		
	Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Aboriginal identity group															
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
First Nations	0.63*	0.59	0.67	0.78*	0.73	0.83	0.91*	0.85	0.97	0.91*	0.85	0.97	0.90*	0.85	0.97
Métis	0.79*	0.74	0.85	0.91*	0.85	0.98	1.06	0.99	1.14	1.05	0.98	1.13	1.04	0.97	1.12
Inuit	0.54*	0.50	0.59	0.75*	0.69	0.83	1.00	0.91	1.10	1.01	0.92	1.11	0.94	0.85	1.04
Male‡	1.05*	1.01	1.09	0.95*	0.91	0.99	1.01	0.97	1.05	0.95*	0.91	0.99	0.95*	0.91	0.99
Age (centred at 20)															
Linear	0.99*	0.98	0.99	0.97*	0.97	0.98	0.98*	0.98	0.98	0.98*	0.98	0.99	0.98*	0.98	0.99
Quadratic	0.9998*	0.9997	0.9998	1.0001*	1.0000	1.0001	0.9999*	0.9998	1.0000	0.9999*	0.9998	1.0000	0.9999*	0.9998	1.0000
Personal income															
Less than $10,000	...	...	...	0.51*	0.45	0.57	0.49*	0.43	0.55	0.48*	0.43	0.54	0.48*	0.43	0.54
$10,000 to $19,999	...	...	...	0.52*	0.49	0.56	0.53*	0.50	0.57	0.53*	0.49	0.57	0.53*	0.49	0.57
$20,000 to $29,999	...	...	...	0.56*	0.53	0.60	0.57*	0.53	0.60	0.57*	0.53	0.60	0.57*	0.53	0.60
$30,000 to $39,999†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	...	...	...	0.91*	0.86	0.98	0.92*	0.86	0.99	0.92*	0.86	0.99	0.92*	0.86	0.99
$60,000 or more	...	...	...	0.93*	0.87	1.00	0.93*	0.86	1.00	0.93*	0.86	1.00	0.92*	0.86	0.99
Education															
Less than secondary graduation	...	...	...	0.63*	0.59	0.68	0.66*	0.61	0.70	0.65*	0.61	0.70	0.65*	0.60	0.69
Secondary graduation†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	...	...	...	1.02	0.94	1.10	0.98	0.91	1.07	1.01	0.93	1.09	1.01	0.93	1.10
Postsecondary graduation	...	...	...	1.20*	1.13	1.27	1.11*	1.05	1.18	1.13*	1.07	1.20	1.14*	1.07	1.21
Daily smoker‡	...	...	...	...	...	...	0.57*	0.54	0.59	0.55*	0.53	0.58	0.55*	0.52	0.58
Body mass index															
Under-/Acceptable weight†	...	...	...	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	...	...	...	...	...	...	0.75*	0.72	0.79	0.76*	0.72	0.79	0.75*	0.72	0.79
Obese	...	...	...	...	...	...	0.43*	0.41	0.45	0.44*	0.41	0.46	0.43*	0.41	0.46
Saw doctor or nurse in past year‡	...	...	...	...	...	...	...	...	...	0.62*	0.59	0.65	0.62*	0.59	0.65
Urban residence‡	...	...	...	...	...	...	...	...	...	...	...	...	0.88*	0.84	0.93

* significantly different from zero ($p<.01$)
† reference category
‡ reference category is absence of characteristic
... not applicable
Notes: Missing value categories for income, education and body mass index are included in model, but are not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table D
Unadjusted and adjusted odds ratios relating Aboriginal identity and selected characteristics to being diagnosed with at least one chronic condition (relative to non-Aboriginal identity), off-reserve population aged 20 or older, Canada, 2006/2007

	First Nations			Métis			Inuit		
		99% confidence interval			99% confidence interval			99% confidence interval	
	Odds ratio	from	to	Odds ratio	from	to	Odds ratio	from	to
Unadjusted	1.20*	1.13	1.27	1.20*	1.12	1.28	0.74*	0.68	0.81
Adjusted for:									
Age and sex	1.84*	1.72	1.96	1.82*	1.70	1.96	1.20*	1.09	1.32
plus income	1.65*	1.54	1.77	1.70*	1.58	1.83	1.07	0.98	1.18
plus education	1.70*	1.59	1.82	1.73*	1.61	1.86	1.05	0.95	1.16
plus daily smoker	1.79*	1.67	1.91	1.78*	1.66	1.91	1.12*	1.02	1.23
plus body mass index	1.67*	1.57	1.79	1.66*	1.55	1.79	1.10	1.00	1.21
plus saw doctor/nurse in past year	1.88*	1.76	2.00	1.90*	1.77	2.04	1.20*	1.09	1.32
plus urban residence	1.84*	1.72	1.96	1.83*	1.70	1.96	1.20*	1.09	1.33

* significantly different from estimate for non-Aboriginal (p<.01)

Notes: Chronic conditions are arthritis, asthma, cancer, diabetes, emphysema, heart problems, high blood pressure, effects of stroke, stomach or intestinal ulcers. Models used to demonstrate univariate associations include Aboriginal group identifiers, age, sex and variable(s) listed in the row.

Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table E
Adjusted odds ratios from sequential step-wise logistic regression models for being diagnosed with at least one chronic condition, off-reserve population aged 20 or older, Canada, 2006/2007

	Step 1			Step 2			Step 3			Step 4			Step 5		
	Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Aboriginal identity group															
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
First Nations	1.84*	1.72	1.96	1.57*	1.47	1.68	1.41*	1.32	1.51	1.42*	1.33	1.53	1.43*	1.33	1.53
Métis	1.82*	1.70	1.96	1.64*	1.52	1.76	1.47*	1.37	1.58	1.52*	1.41	1.64	1.53*	1.42	1.65
Inuit	1.20*	1.09	1.32	0.98	0.89	1.08	0.86*	0.77	0.95	0.83*	0.75	0.92	0.86*	0.77	0.96
Male†	0.84*	0.81	0.88	0.89*	0.85	0.93	0.82*	0.79	0.86	0.90*	0.86	0.95	0.91*	0.86	0.95
Age (centred at 20)															
Linear	1.00	0.99	1.00	1.01	1.00	1.01	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00
Quadratic	1.0009*	1.0008	1.0010	1.0008*	1.0007	1.0008	1.0009*	1.0008	1.0010	1.0009*	1.0008	1.0010	1.0009*	1.0008	1.0010
Personal income															
Less than $10,000	...	...	...	1.24*	1.09	1.41	1.28*	1.12	1.46	1.30*	1.14	1.48	1.30*	1.14	1.48
$10,000 to $19,999	...	...	...	1.50*	1.39	1.63	1.51*	1.39	1.63	1.51*	1.39	1.64	1.51*	1.40	1.64
$20,000 to $29,999	...	...	...	1.46*	1.36	1.56	1.47*	1.37	1.57	1.48*	1.38	1.59	1.49*	1.39	1.59
$30,000 to $39,999†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	...	...	...	1.11*	1.03	1.19	1.11*	1.03	1.19	1.12*	1.04	1.20	1.12*	1.04	1.20
$60,000 or more	...	...	...	1.05	0.97	1.13	1.04	0.96	1.13	1.05	0.97	1.14	1.05	0.97	1.14
Educational attainment															
Less than secondary graduation	...	...	...	1.24*	1.15	1.34	1.22*	1.13	1.31	1.24*	1.15	1.34	1.25*	1.15	1.35
Secondary graduation†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	...	...	...	1.20*	1.10	1.31	1.22*	1.11	1.33	1.18*	1.07	1.29	1.17*	1.07	1.29
Postsecondary graduation	...	...	...	0.95	0.89	1.01	1.00	0.94	1.06	0.96	0.90	1.02	0.96	0.90	1.02
Daily smoker‡	...	...	...	...	...	...	1.22*	1.15	1.28	1.28*	1.21	1.35	1.28*	1.21	1.35
Body mass index															
Under-/Acceptable weight†	...	...	...	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	...	...	...	...	...	...	1.50*	1.42	1.58	1.49*	1.41	1.57	1.49*	1.42	1.57
Obese	...	...	...	...	...	...	2.70*	2.54	2.87	2.65*	2.49	2.82	2.66*	2.50	2.83
Saw doctor or nurse in past year‡	...	...	...	...	...	...	...	...	...	2.66*	2.50	2.82	2.65*	2.50	2.82
Urban residence‡	...	...	...	...	...	...	...	...	...	...	...	...	1.07*	1.01	1.13

* significantly different from zero ($p<.01$)
† reference category
‡ reference category is absence of characteristic
... not applicable
Notes: Chronic conditions include arthritis, asthma, cancer, diabetes, emphysema, heart problems, high blood pressure, effects of stroke, stomach or intestinal ulcers. Missing value categories for income, education and body mass index are included in model, but are not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table F
Unadjusted and adjusted odds ratios relating Aboriginal identity and selected characteristics to being diagnosed with diabetes (relative to non-Aboriginal identity), off-reserve population aged 20 or older, Canada, 2006/2007

	First Nations			Métis			Inuit		
	Odds ratio	99% confidence interval		Odds ratio	99% confidence interval		Odds ratio	99% confidence interval	
		from	to		from	to		from	to
Unadjusted	1.47*	1.33	1.64	1.16*	1.03	1.32	0.75*	0.62	0.91
Adjusted for:									
Age and sex	2.14*	1.91	2.39	1.61*	1.42	1.83	1.22	1.00	1.49
plus income	1.94*	1.73	2.18	1.52*	1.33	1.73	1.10	0.89	1.34
plus education	1.99*	1.78	2.23	1.53*	1.34	1.74	1.03	0.84	1.26
plus daily smoker	2.17*	1.94	2.42	1.62*	1.43	1.85	1.25*	1.02	1.53
plus body mass index	1.84*	1.64	2.06	1.35*	1.19	1.54	1.02	0.83	1.25
plus saw doctor/nurse in past year	2.14*	1.92	2.40	1.63*	1.43	1.85	1.21	0.99	1.48
plus urban residence	2.15*	1.93	2.41	1.63*	1.44	1.86	1.29*	1.05	1.59

* significantly different from estimate for non-Aboriginal (p<.01)
Notes: Models used to demonstrate univariate associations include Aboriginal group identifiers, age, sex and variable(s) listed in the row.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table G
Adjusted odds ratios from sequential step-wise logistic regression models for being diagnosed with diabetes, off-reserve population aged 20 or older, Canada, 2006/2007

	Step 1			Step 2			Step 3			Step 4			Step 5		
	Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Aboriginal identity group															
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
First Nations	2.14*	1.91	2.39	1.85*	1.65	2.08	1.63*	1.45	1.84	1.64*	1.46	1.85	1.66*	1.47	1.87
Métis	1.61*	1.42	1.83	1.46*	1.28	1.67	1.25*	1.09	1.43	1.26*	1.10	1.44	1.28*	1.12	1.47
Inuit	1.22	1.00	1.49	0.97	0.79	1.19	0.87	0.90	1.07	0.85	0.69	1.05	0.96	0.77	1.19
Male†	1.24*	1.15	1.37	1.38*	1.27	1.49	1.32*	1.22	1.44	1.39*	1.28	1.51	1.40*	1.29	1.52
Age (centred at 20)															
Linear	1.14*	1.13	1.15	1.14*	1.13	1.16	1.13*	1.12	1.14	1.12*	1.11	1.14	1.13*	1.11	1.14
Quadratic	0.9990*	0.9988	0.9991	0.9988*	0.9987	0.9990	0.9990*	0.9989	0.9992	0.9990*	0.9989	0.9992	0.9990*	0.9989	0.9992
Personal income															
Less than $10,000	...	...	...	1.63*	1.29	2.05	1.70*	1.34	2.15	1.71*	1.35	2.16	1.71*	1.35	2.17
$10,000 to $19,999	...	...	...	1.74*	1.52	1.99	1.75*	1.52	2.01	1.73*	1.50	1.99	1.75*	1.52	2.01
$20,000 to $29,999	...	...	...	1.63*	1.45	1.82	1.67*	1.49	1.88	1.68*	1.49	1.89	1.69*	1.50	1.90
$30,000 to $39,999†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	...	...	...	1.40*	1.23	1.60	1.43*	1.25	1.64	1.44*	1.25	1.64	1.44*	1.26	1.65
$60,000 or more	...	...	...	1.03	0.87	1.21	1.04	0.88	1.22	1.04	0.88	1.23	1.05	0.89	1.23
Educational attainment															
Less than secondary graduation	...	...	...	1.28*	1.13	1.45	1.22*	1.07	1.38	1.22*	1.08	1.39	1.24*	1.09	1.41
Secondary graduation†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	...	...	...	0.98	0.82	1.16	0.96	0.81	1.14	0.93	0.78	1.11	0.93	0.78	1.10
Postsecondary graduation	...	...	...	0.85*	0.76	0.96	0.88*	0.78	0.99	0.85*	0.76	0.96	0.85*	0.76	0.96
Daily smoker‡	...	...	...	...	...	...	0.97	0.88	1.08	1.00	0.91	1.11	1.00	0.90	1.11
Body mass index															
Under-/Acceptable weight†	...	...	...	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	...	...	...	...	...	...	1.92*	1.72	2.14	1.90*	1.70	2.12	1.91*	1.71	2.13
Obese	...	...	...	...	...	...	4.80*	4.30	5.35	4.69*	4.20	5.23	4.74*	4.24	5.29
Saw doctor or nurse in past year‡	...	...	...	...	...	...	...	...	...	2.51*	2.18	2.88	2.51*	2.18	2.88
Urban residence‡	...	...	...	...	...	...	...	...	...	...	...	...	1.23*	1.12	1.36

* significantly different from zero (p<.01)
† reference category
‡ reference category is absence of characteristic
... not applicable
Notes: Missing value categories for income, education and body mass index are included in model, but are not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table H
Unadjusted and adjusted odds ratios relating Aboriginal identity and selected characteristics to being diagnosed with asthma (relative to non-Aboriginal identity), off-reserve population aged 20 or older, Canada, 2006/2007

	First Nations			Métis			Inuit		
	Odds ratio	99% confidence interval		Odds ratio	99% confidence interval		Odds ratio	99% confidence interval	
		from	to		from	to		from	to
Unadjusted	1.97*	1.80	2.16	1.95*	1.77	2.15	1.09	0.94	1.28
Adjusted for:									
Age and sex	1.91*	1.74	2.09	1.92*	1.74	2.12	1.07	0.91	1.25
plus income	1.77*	1.61	1.94	1.81*	1.64	2.00	0.99	0.84	1.15
plus education	1.84*	1.68	2.03	1.88*	1.70	2.08	0.99	0.84	1.16
plus daily smoker	1.90*	1.73	2.08	1.91*	1.73	2.11	1.05	0.89	1.23
plus body mass index	1.80*	1.64	1.97	1.81*	1.64	2.00	1.02	0.87	1.20
plus saw doctor/nurse in past year	1.92*	1.75	2.10	1.95*	1.76	2.15	1.06	0.91	1.24
plus urban residence	1.92*	1.76	2.11	1.94*	1.76	2.15	1.14	0.97	1.34

* significantly different from estimate for non-Aboriginal ($p<.01$)
Notes: Models used to demonstrate univariate associations include Aboriginal group identifiers, age, sex and variable(s) listed in the row.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table I
Adjusted odds ratios from sequential step-wise logistic regression models for being diagnosed with asthma, off-reserve population aged 20 or older, Canada, 2006/2007

	Step 1			Step 2			Step 3			Step 4			Step 5		
	Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Aboriginal identity group															
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
First Nations	1.91*	1.74	2.09	1.73*	1.57	1.91	1.64*	1.49	1.80	1.64*	1.49	1.81	1.65*	1.49	1.82
Métis	1.92*	1.74	2.12	1.79*	1.62	1.98	1.69*	1.53	1.88	1.71*	1.55	1.90	1.74*	1.57	1.93
Inuit	1.07	0.91	1.25	0.93	0.79	1.10	0.90	0.76	1.06	0.88	0.75	1.04	0.96	0.81	1.14
Male‡	0.63*	0.59	0.68	0.65*	0.60	0.69	0.62*	0.58	0.66	0.66*	0.61	0.71	0.66*	0.61	0.71
Age (centred at 20)															
Linear	0.99*	0.98	1.00	0.99	0.99	1.00	0.99*	0.98	0.99	0.99*	0.98	0.99	0.99*	0.98	0.99
Quadratic	1.0002*	1.0000	1.0003	1.0001	0.9999	1.0002	1.0001*	1.0000	1.0003	1.0001*	1.0000	1.0002	1.0001*	1.0000	1.0002
Personal income															
Less than $10,000	...	...	...	0.92	0.75	1.13	0.94	0.76	1.15	0.94	0.77	1.16	0.94	0.77	1.16
$10,000 to $19,999	...	...	...	1.23*	1.10	1.38	1.22*	1.09	1.37	1.23*	1.09	1.37	1.23*	1.10	1.38
$20,000 to $29,999	...	...	...	1.27*	1.15	1.40	1.27*	1.15	1.40	1.27*	1.15	1.40	1.27*	1.15	1.40
$30,000 to $39,999†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	...	...	...	0.94	0.84	1.06	0.94	0.84	1.06	0.94	0.84	1.06	0.95	0.84	1.06
$60,000 or more	...	...	...	0.98	0.86	1.12	0.98	0.86	1.12	0.98	0.86	1.12	0.99	0.87	1.13
Education															
Less than secondary graduation	...	...	...	1.32*	1.18	1.49	1.31*	1.16	1.47	1.31*	1.17	1.48	1.32*	1.18	1.49
Secondary graduation†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	...	...	...	1.18*	1.03	1.35	1.18*	1.03	1.35	1.15*	1.00	1.32	1.15*	1.00	1.31
Postsecondary graduation	...	...	...	1.16*	1.05	1.28	1.19*	1.07	1.32	1.16*	1.05	1.28	1.16*	1.04	1.28
Daily smoker§	...	...	...	...	...	...	1.07	0.98	1.16	1.08*	1.00	1.18	1.08*	1.00	1.18
Body mass index															
Under-/Acceptable weight†	...	...	...	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	...	...	...	...	...	...	1.21*	1.12	1.32	1.20*	1.11	1.31	1.21*	1.11	1.31
Obese	...	...	...	...	...	...	1.69*	1.54	1.85	1.65*	1.51	1.81	1.66*	1.52	1.82
Saw doctor or nurse in past year‡	...	...	...	...	...	...	...	...	...	1.80*	1.63	1.98	1.79*	1.63	1.98
Urban residence‡	...	...	...	...	...	...	...	...	...	...	...	...	1.15*	1.06	1.26

* significantly different from zero ($p<.01$)
† reference category
‡ reference category is absence of characteristic
... not applicable
Notes: Missing value categories for income, education and body mass index are included in model, but are not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table J
Unadjusted and adjusted odds ratios relating Aboriginal identity and selected characteristics to being diagnosed with arthritis (relative to non-Aboriginal identity), off-reserve population aged 20 or older, Canada, 2006/2007

	First Nations			Métis			Inuit		
	Odds ratio	99% confidence interval		Odds ratio	99% confidence interval		Odds ratio	99% confidence interval	
		from	to		from	to		from	to
Unadjusted	1.57*	1.46	1.69	1.52*	1.41	1.64	0.88*	0.78	0.99
Adjusted for:									
Age and sex	2.46*	2.27	2.66	2.38*	2.18	2.59	1.53*	1.34	1.73
plus income	2.24*	2.07	2.43	2.24*	2.05	2.44	1.38*	1.21	1.57
plus education	2.32*	2.14	2.51	2.27*	2.08	2.48	1.36*	1.19	1.55
plus daily smoker	2.33*	2.15	2.52	2.27*	2.08	2.47	1.35*	1.18	1.53
plus body mass index	2.30*	2.13	2.50	2.22*	2.04	2.42	1.45*	1.28	1.65
plus saw doctor/nurse in past year	2.48*	2.29	2.68	2.41*	2.21	2.63	1.52*	1.34	1.73
plus urban residence	2.44*	2.25	2.64	2.34*	2.15	2.55	1.43*	1.25	1.63

* significantly different from estimate for non-Aboriginal ($p<.01$)
Notes: Models used to demonstrate univariate associations include Aboriginal group identifiers, age, sex and variable(s) listed in the row.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.

Table K
Adjusted odds ratios from sequential step-wise logistic regression models for being diagnosed with arthritis, off-reserve population aged 20 or older, Canada, 2006/2007

	Step 1			Step 2			Step 3			Step 4			Step 5		
	Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval		Adjusted odds ratio	99% confidence interval	
		from	to		from	to		from	to		from	to		from	to
Aboriginal identity group															
Non-Aboriginal†	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
First Nations	2.46*	2.27	2.66	2.17*	2.00	2.36	1.96*	1.80	2.13	1.97*	1.81	2.14	1.96*	1.80	2.13
Métis	2.38*	2.18	2.59	2.18*	1.99	2.38	1.97*	1.81	2.16	2.00*	1.83	2.19	1.99*	1.82	2.18
Inuit	1.53*	1.34	1.73	1.28*	1.12	1.46	1.12	0.98	1.28	1.10	0.96	1.26	1.06	0.92	1.22
Male‡	0.59*	0.56	0.63	0.63*	0.60	0.67	0.60*	0.57	0.64	0.63*	0.59	0.66	0.63*	0.59	0.66
Age (centred at 20)															
Linear	1.12*	1.11	1.13	1.12*	1.12	1.13	1.12*	1.11	1.12	1.11*	1.11	1.12	1.11*	1.11	1.12
Quadratic	0.9993*	0.9992	0.9994	0.9992*	0.9991	0.9993	0.9993*	0.9992	0.9994	0.9993*	0.9992	0.9994	0.9993*	0.9992	0.9994
Personal income															
Less than $10,000	...	...	...	1.24*	1.06	1.45	1.26*	1.08	1.48	1.27*	1.08	1.49	1.27*	1.08	1.49
$10,000 to $19,999	...	...	...	1.53*	1.40	1.69	1.49*	1.36	1.64	1.49*	1.35	1.64	1.49*	1.35	1.63
$20,000 to $29,999	...	...	...	1.44*	1.33	1.56	1.41*	1.31	1.53	1.42*	1.31	1.54	1.42*	1.31	1.53
$30,000 to $39,999†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
$40,000 to $59,999	...	...	...	1.09	1.00	1.20	1.08	0.98	1.18	1.08	0.98	1.18	1.08	0.98	1.18
$60,000 or more	...	...	...	0.99	0.89	1.10	0.98	0.88	1.09	0.98	0.88	1.09	0.97	0.88	1.08
Education															
Less than secondary graduation	...	...	...	1.17*	1.08	1.28	1.14*	1.04	1.24	1.14*	1.05	1.25	1.14*	1.04	1.25
Secondary graduation†	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Some postsecondary	...	...	...	1.03	0.92	1.16	1.04	0.92	1.16	1.01	0.90	1.14	1.01	0.90	1.14
Postsecondary graduation	...	...	...	0.93	0.86	1.00	0.97	0.90	1.05	0.95	0.87	1.02	0.95	0.88	1.03
Daily smoker‡	...	...	...	...	...	...	1.45*	1.36	1.55	1.50*	1.41	1.60	1.50*	1.41	1.60
Body mass index															
Under-/Acceptable weight†	...	...	...	...	...	...	1.00	...	...	1.00	...	...	1.00	...	...
Overweight	...	...	...	...	...	...	1.31*	1.23	1.40	1.30*	1.22	1.39	1.30*	1.22	1.39
Obese	...	...	...	...	...	...	1.91*	1.78	2.05	1.86*	1.73	2.00	1.85*	1.72	1.99
Saw doctor or nurse in past year‡	...	...	...	...	...	...	...	...	...	2.05*	1.89	2.22	2.05*	1.89	2.23
Urban residence‡	...	...	...	...	...	...	...	...	...	...	...	...	0.94	0.88	1.00

* significantly different from zero ($p<.01$)
† reference category
‡ reference category is absence of characteristic
... not applicable
Notes: Missing value categories for income, education and body mass index group are included in model, but are not shown.
Sources: 2006 Aboriginal Peoples Survey; 2007 Canadian Community Health Survey, cycle 4.1.